

# Potatoes

## HISTORY

Potatoes first entered known human history 13,000 years ago, when they were discovered and grown in South America. These potatoes were poisonous and had to be covered in a layer of clay, which would remove the toxin so the potato could be digested safely by humans. The people of the Andes mountains eventually developed a variety of potatoes that didn't have these poisonous attributes. In Peru and Bolivia, you can sometimes still find those early, poisonous varieties in markets, where they always come with a package of clay dust.

In Inca society (1200 to 1572), potatoes were highly valuable. The people would leave their potatoes outside overnight to freeze, thaw them in the sun until they were soft and juicy, then squeeze out the water, resulting in a food called *chuño*. Chuño could be stored for up to 10 years without needing refrigeration. It supplied a reliable food reserve for years with bad harvests and was the main source of nutrition for Inca armies because it was light and easy to carry.

Spanish conquistadors brought potatoes back to Spain from Peru in 1532. They weren't that popular at first, but by 1600, the potato had spread to at least 10 other countries. Some Europeans resisted the potato because they believed it was created by witches or devils, since it grew underground. However, potatoes came to the rescue during famine times, especially during the 1600s and 1700s. They survived where other crops failed and provided a more concentrated source of calories and nutrition than grains.

In the 1800s, the potato was introduced to Ireland and quickly became a staple food among the poor during the cold months. In 1845, the Irish Potato Famine began when *late blight*, a fungus-like organism, spread – killing three-quarters of potato crops over the next seven years. The infestation had a

devastating impact on Ireland's population and caused roughly one million people to leave their homeland as refugees.

Potatoes arrived in Canada in the mid-1600s by way of European colonists. They were first grown in what is now New Brunswick and Prince Edward Island, eventually spreading across the country.

Today, Canada is one of the top 20 potato producers in the world. The crop makes up 36 per cent of vegetables eaten in Canada – placing it among the superstars of Canadian agriculture.

## PRODUCTION

Manitoba is Canada's second largest potato producer, right behind Prince Edward Island. In fact, a whopping one fifth of the land in Canada used to grow potatoes is in Manitoba! Potatoes are our province's fourth most valuable crop after canola, wheat and soybeans.

The potato is a *tuber*. A tuber is the swelling of an underground stem. Tubers contain stored nutrients and buds. Commercial potato plants are grown from *seed potatoes* either planted whole or cut into pieces. Buds or eyes found on the seed potato sprout and grow into a plant. Although the potatoes planted in the ground are called seed potatoes, they are tubers, not seeds. In Canada, the Canadian Food Inspection Agency certifies seed potatoes to ensure they meet government standards.

The potato plant is an annual that grows up to 100 cm tall. One potato plant can produce multiple tubers. Potato plants grow best in cool, well-drained, loose, fertile soil in full sun. They are sensitive to spring and fall frost. Potatoes must be rotated with other crops every three to five years to help manage insects and disease. Because they return little organic matter to the soil, crop rotation helps keep the soil in good condition.



The potato planting season begins in late April or early May. Seed potatoes are cut into smaller pieces, then loaded into the *hopper* of a potato planter and planted in rows. Next, each seed piece is covered with soil and *hilled*: soil around the planted area is scooped up to create a mound. Hilling is an essential part of the potato growing process. It helps ensure the tubers are not exposed to light and prevents them from turning green and inedible.

As the plants grow, farmers face the challenge of protecting them from pests, diseases, and weeds. Pest management techniques have evolved into what is known as *integrated pest management* (IPM). IPM involves regular monitoring for the presence of pests, establishing thresholds for allowable damage, and using a combination of different management strategies to control diseases, weeds, and insects. Purchasing certified seed that is free of disease, choosing *cultivars* (varieties) that are pest resistant, applying chemical and biological controls, and introducing beneficial predators are all examples of management practices that are used to manage pests in potato crops.

Farmers sometimes *irrigate* their potato fields to make sure they receive enough moisture during the growing season. Irrigation systems come in many different styles. The type of irrigation system required depends on the soil type, topography, water supply, field size, and budget. The latest *smart irrigation systems* measure all these things as well as current weather conditions to determine when to turn irrigation on and off. These smart systems decrease water use while maximizing yields, ensuring the crop gets exactly the right amount of water when it needs it. Farmers can track what their irrigation system is doing on their cell phone.

When a potato plant begins to flower, the vines are mature enough and have enough leaf area to start forming tubers. It can take many weeks after this stage for the potatoes to grow and “bulk” in preparation for harvest.

Harvesting usually begins in September. It is labour intensive and takes six to eight weeks to complete. A machine called a *windrower* digs up the rows of potatoes and piles them neatly in a row. Then a second machine called a *harvester* picks up the potatoes and drops them into a *bulk truck* that transports them to the storage facility, where rocks, weeds and clumps of soil are picked out by hand.

Once the harvest and picking are done, potatoes are piled into a storage bin and *cured*. Curing helps heal any wounds that occur during harvest. Curing takes about six to eight weeks. During the first two weeks of curing, mature, healthy potatoes are kept at 15°C and 95 per cent humidity. After two weeks, the potatoes need to be lowered 2°C per week until they reach their long-term storage temperature. Potatoes are stored depending on their intended use. Seed and table potatoes are stored at 4°C, French fry potatoes at 7°C, and chipping potatoes at 10 to 13°C. Humidity is kept at 90 to 95 per cent. It’s crucial to keep the temperature consistent during storage to prevent rot.

Finally, throughout the winter, potatoes are removed from the storage facility, graded, and bagged for delivery, or transported directly to a processing plant.

*Keystone Potato Producers Association*, an organization that represents Manitoba processing potato producers, negotiates the amount of money producers are paid for their potatoes by processing plants.

Most of the fresh Manitoba potatoes that you buy and cook at home are sold through *Peak of the Market*, a grower-owned potato and vegetable supplier.

French fries and other frozen products make up 90 per cent of Manitoba’s potato exports, which demonstrates just how important this commodity is to our economy. The remaining exports include fresh potatoes, chilled potatoes, seed potatoes, and potato starch and chips. The United States is our biggest potato customer, importing 96 per cent of our potatoes.



## VARIETIES

Manitoba produces seed potatoes, fresh (table) potatoes, and processing (French fry) potatoes. There are over 24 varieties of potatoes grown in Manitoba. Certain varieties work best for certain uses.

Varieties of table potatoes grown in Manitoba are:

- **Table Reds** – Norland, Dark Red Norland and Sangre
- **Yellows** – Colomba and Musica
- **Table Russets** – Goldrush and Innovator
- **Speciality** – Banana and Russian Blue

Varieties of processing potatoes grown in Manitoba are:

- **French Fries** – Russet Burbank, Umatilla Russet and Ranger Russet

## PROCESSING

Manitoba is home to four major potato processing plants:

- **Simplot** (Portage la Prairie)
- **McCain Foods** (Carberry, Portage la Prairie)
- **Old Dutch Food** (Winnipeg)
- **Naleway Foods** (Winnipeg)

When it expanded in 2017, Simplot increased Manitoba's in-province processing capacity by 17 per cent.

These processing plants take in potatoes from right off the field during the summer. For the rest of the year, producers send their potatoes to the plants from storage facilities. Manitoba potato producers have the capacity to store 18.5 million hundredweight of potatoes. This means that potato farmers in the province can store 18.5 million bags of potatoes that weigh 45 kg each!

**DID YOU KNOW?**

It takes one kilogram of potatoes to produce half a kilogram of French fries, and four kilograms of potatoes to produce one kilogram of chips.

## ENVIRONMENT

Many of Manitoba's processing plants reuse methane produced by processing wastes to help power parts of the plant.

Manitoba potato growers follow *agronomic practices* that help protect and maintain the environment. Some plant cover *crops* to help manage soil erosion, soil fertility, soil quality, water, weeds, pests, diseases, biodiversity, and wildlife. They incorporate *green manure crops* – plants that increase soil organic matter – into their crop rotation. They use *field mapping technology* and *variable rate fertilizer application technology* to optimize how much fertilizer they use and where they place it. They also plant *vegetative filter strips* along field edges to reduce the risk of pesticides, water, and nutrients moving off-site.

## NUTRITION

Potatoes are excellent sources of carbohydrates, protein, and fibre, with very little fat. Potatoes are composed of about 80 per cent water, and contain potassium, vitamin B and vitamin C in addition to other nutrients.



**INDUSTRY IN MANITOBA**

**Acres Harvested:** 78,000 (2021)

**Production:** 1,266,350 metric tonnes (2021)



**INDUSTRY IN CANADA**

**Acres harvested:** 380,980 (2021)

**Production:** 6,372,188 metric tonnes (2021)

**Number of Producers:** 1,005 potato farms (2016)



# CAREERS

- » Farmer
- » Processing worker
- » Meteorologist
- » Technology support
- » Agronomist
- » Irrigation worker
- » Fertilizer/chemical sales
- » Plant researcher
- » Harvest worker



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# FARMER PROFILE



**JEREMY & MARLON KUHL**

Southern Potato Co. - Winkler, Manitoba

“Potatoes are an important crop in Manitoba because they provide safe, affordable, nutrition to consumers and families. They also contribute significantly to the economy by providing meaningful employment to many Manitobans. Our farm grows about 3,000 acres of potatoes and employs about 65 people year round. Potatoes are challenging, yet fun to grow.”